

## Re: Epistemology 201: The Science of Science

**Source:** <http://sci.tech-archive.net/Archive/sci.cognitive/2005-02/0034.html>

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**Date:** 02/02/05

Date: Wed, 2 Feb 2005 20:06:21 +1300

> > > *You are perhaps referring to First Order Predicate Calculus (FOPC).*  
> > > *And indeed, mathematicians do use FOPC. However, mathematics is not*  
> > > *FOPC, and FOPC is not sufficiently expressible to allow it to be used*  
> > > *exclusively.*  
>  
> > > *Given a particular system of axioms, say PA (the Peano Axioms),*  
> > > *mathematicians could in principle use FOPC applied to those axioms.*  
> > > *But mathematics is not confined to working within a particular axiom*  
> > > *system. Moreover, the discussion axiom system itself is part of*  
> > > *mathematics.*  
>  
> > *Maths is an extension of FOPC, like PA.*  
>  
> *Not really. Mathematics is much older than FOPC, so it doesn't make*  
> *sense to say it is an extension of FOPC.*

Okay, this is really strange to me because this is so not what I've come to understand mathematics as. These days, in mathematical reasoning, logical arguments are used to deduce consequences (theorems) of the assumptions of maths (axioms). Most of maths is built from sets, so the basic assumptions of maths are the axioms of set theory, in particular ZFC set theory. [Chapter Zero – Fundamental Notions of Abstract Mathematics, Carol Schumacher]

You are suggesting that maths is not this formal system, so I am lead to assume that you have some sort of prior understanding of what is mathematically legal and illegal, like most people. But is this type of reasoning informal or have we our own set of assumptions, much like axioms, that enable us to perform mathematical inference. When there is a disagreement, where do we turn? From my understanding it is this formalised system of mathematics, which took root with Whitehead and Russell in the principia mathematica. Hence its FOPC roots.

I can accept that the axioms are not often invoked in the heat of proofs, but then neither is the road-code when we are driving. Axioms as such don't need to be the way to go either. The more intuitive way to go are to use rules of inference, which are equivalent and perhaps closer to the story about how we 'do' maths.

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Out of interest, if maths is not this formal system then how can abstract